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TITLE: ACCESSORIES FOR A WORKSPACE

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## ACCESSORIES FOR A WORKSPACE

This application is a divisional of Application No. 10/166,018, filed June 10, 2002, hereby incorporated by reference herein, which claims priority under 35 U.S.C. § 119(e) to provisional Application Number 60/298,363, filed June 16, 2001, hereby also incorporated by reference herein.

### BACKGROUND

The present invention relates generally to a workspace, and more particularly, to accessories for the workspace and a workspace panel.

Office managers have widely adopted workspace panels as a cost effective and efficient choice for constructing workspaces for office workers. Typically, office managers prefer to use workspace panels instead of architectural walls when designing a work area because workspace panels can be readily disassembled and reconfigured as needed to satisfy the changing needs of the office workers. Thus, workspace panels provide considerably more flexibility when designing work areas than is possible with architectural walls. Later redesigns of existing work areas are also considerably less expensive when workspace panels are used than when architectural walls are used.

Many workspace panels, however, provide a limited degree of usefulness beyond the basic function of separating individual workspaces. Accordingly, many workspace panels provide little more than simple separating partitions that can be connected together at the sides to form work spaces therein. This disadvantage lowers the work efficiency of office workers and lowers the office worker's satisfaction with the work area. Thus, there is a need for workspace panels with greater versatility and increased functionality.

One need that exists is a system for attaching a variety of accessories along a length of the workspace panel using a rail attached to the workspace panel. In order to maintain an attractive appearance of the workspace panel, the rail would be unobtrusive and compact. The rail also would preferably be

inexpensive to manufacture and inexpensive and simple to attach to the workspace panel. Desirably, the rail would be readily attachable to older workspace panels already in use within existing work areas so that office managers could update older workspace panels inexpensively. Some examples of accessories that would desirably be attached to a workspace panel rail include lights, privacy and light reflecting screens and storage units.

Another need that exists is a system for attaching a variety of interchangeable accessories to a surface on the workspace panel using work tools that connect to apertures in the workspace surface. To provide additional flexibility, the workspace surface with apertures would be a removable tile connectable to a workspace panel frame. Thus, the apertures would be positionable in a variety of locations on the workspace panel as desired by individual office workers. The workspace surface would also be compatible with older workspace panels already in use within existing work areas so that office managers could update older workspace panels inexpensively. Desirably, the work tools would be capable of being connected to more than one type of attaching surface, such as a surface with apertures and a support structure with rails. Some examples of accessories that would desirably be attached to a workspace panel surface include a display tray, a document holder, a storage tray, a pencil holder, a disk holder, a bundle clip, a document gripper and a file organizer.

Another need that exists is a workspace panel surface that diffuses ambient light through the workspace panel without permitting visual sight through the surface. To provide additional flexibility, the light-diffusing surface would be a removable tile connectable to a workspace panel frame. The light-diffusing surface would also be compatible with older workspace panels already in use within existing work areas so that office managers could update older workspace panels inexpensively. Desirably, the light-diffusing surface would be covered by a fabric material to provide a pleasing aesthetic exterior surface. Further, the light-diffusing surface could be tackable to allow office workers to tack papers and other items to the surface.

Another need that exists is a wire management system. The wire management system would allow excess lengths of wire to be easily stored compactly within a workspace without the need for additional retention materials, such as tape or straps. Desirably, the wire management system would be capable of storing lengths of wire from more than wire.

## BRIEF SUMMARY

Accordingly, a monorail is provided that may be attached to the top surface of a workspace panel. The monorail includes an upper retention groove and side attaching members for attaching various accessories to the workspace panel. The upper retention groove includes upper retention flanges with an opening extending therebetween. The side attaching members include a top channel, a bottom channel and an outer flange. The monorail also includes cable management grooves. Accessories that may be attached to the monorail include a privacy screen, a light reflecting screen, a linear light, a flexible light and storage units.

A panel tile with apertures is also provided that may be attached to the workspace panel using snaps and hooks along the rear side of the tile. Apertures extend through a surface of the panel tile which may be used to attach accessories thereto. The accessories include connecting hooks that are attached to the panel tile by inserting a first attachment portion through the apertures. The connecting hooks also include a second attachment portion for alternatively attaching the accessories to a tool rail with rails. Accessories that may be attached to the panel tile with apertures include a display tray, a document holder, a storage tray, a pencil holder, a disk holder, a bundle clip, a document gripper and a file organizer.

A fabric frame tile is also provided that may be attached to the workspace panel using hooks and clips along the rear side of the tile. The fabric frame tile includes a semi-transparent screen made of a polycarbonate material that extends between vertical stiles and horizontal cross members. A fabric material is also included as an outer aesthetic covering. The semi-transparent screen allows light to diffuse through the workspace panel and

into the workspace. The semi-transparent screen may also be tackable to support tacks pressed into the screen.

A wire management cleat is also provided that may be attached to the underside of a worksurface. The cleat includes a base section with side surfaces which wire can be wrapped around for storage. First hooks are also included for retaining the ends of the wire. The cleat also includes secondary cleats with opposing surfaces which additional wires can be wrapped around for storage. Second hooks are also included for retaining the ends of the additional wires.

#### BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

The invention, including its construction and method of operation is illustrated more or less diagrammatically in the drawings, in which:

Figure 1 is a perspective view of a workspace constructed with workspace panels, showing accessories attached to the workspace panels;

Figure 2 is a top perspective view of a monorail with an end cap;

Figure 3 is a bottom perspective view of the monorail with the end cap;

Figure 4 is a cross-section view of the monorail;

Figure 5 is a perspective view of a privacy screen attached to the monorail;

Figure 6 is an enlarged perspective view of the privacy screen attached to the monorail, showing a retaining member;

Figure 7 is a longitudinal cross-section view of the privacy screen attached to the monorail, showing the retaining member;

Figure 8 is a lateral cross-section view of the privacy screen attached to the monorail, showing the retaining member;

Figure 9 is a perspective view of a curved light reflecting screen with a retaining member;

Figure 10 is a side view of the curved light reflecting screen with the retaining member;

Figure 11 is a perspective view of an attaching mechanism for a screen, showing the attaching mechanism attached to the monorail;

Figure 12 is a top plan view of a second member of the attaching mechanism for a screen;

Figure 13 is a rear perspective view of a linear light attached to the monorail;

5           Figure 14 is an enlarged front perspective view of the linear light attached to the monorail, showing an attaching mechanism;

Figure 15 is an enlarged rear perspective view of the linear light, showing the attaching mechanism;

10           Figure 16 is a front perspective view of a flexible light attached to the monorail;

Figure 17 is an exploded perspective view of the flexible light attaching mechanism;

Figure 18 is a side perspective view of a storage unit attached to the monorail in a first position;

15           Figure 19 is a side view of the storage unit attached to the monorail in the first position;

Figure 20 is an enlarged side view of the storage unit attached to the monorail in the first position, showing the attaching mechanism;

20           Figure 21 is a side view of the storage unit attached to the monorail in a second position, showing the attaching mechanism;

Figure 22 is a rear perspective view of the storage unit attached to the monorail in the second position, showing a top view of the attaching mechanism;

25           Figure 23 is a side view of the storage unit attached to the monorail in a third position, showing the attaching mechanism;

Figure 24 is a rear perspective view of the storage unit, showing a bracket assembly with the attaching mechanism;

Figure 25 is a front perspective view of the bracket assembly with the attaching mechanism;

30           Figure 26 is a front perspective view of the storage unit with a back panel removed, showing the bracket assembly connected to the storage unit;

Figure 27 is an enlarged front perspective view of the storage unit with the back panel removed, showing bracket assembly connecting arms engaged in cavities in the storage unit;

5        Figure 28 is an enlarged front perspective view of the storage unit with the back panel removed, showing a first bracket member with the connecting arms detached from a second bracket member;

Figure 29 is a front perspective view of a display tray attached to a panel tile with apertures;

Figure 30 is a bottom perspective view of the display tray;

10       Figure 31 is a rear perspective view of the display tray attached to the panel tile with apertures, showing a backing sheet broken away to illustrate display tray connecting hooks;

15       Figure 32 is an enlarged rear perspective view of the display tray attached to the panel tile with apertures, showing the backing sheet removed to illustrate the connecting hooks;

Figure 33 is a side perspective view of a portion of the display tray attached to a portion of a tool rail;

Figure 34 is front bottom perspective view of a document holder attached to the panel tile with apertures;

20       Figure 35 is a side perspective view of the document holder attached to the panel tile with apertures;

Figure 36 is a rear bottom perspective view of the document holder, showing connecting hooks;

25       Figure 37 is a rear perspective view of the document holder attached to the panel tile with apertures, showing the backing sheet broken away to illustrate the connecting hooks;

Figure 38 is a side perspective view of a portion of the document holder attached to a portion of the tool rail;

Figure 39 is a front perspective view of a storage tray;

30       Figure 40 is a rear perspective view of the storage tray, showing connecting hooks;

Figure 41 is a front perspective view of a pencil holder;

Figure 42 is a rear perspective view of the pencil holder, showing connecting hooks;

Figure 43 is a top perspective view of the pencil holder;

Figure 44 is a front perspective view of a disk holder;

5        Figure 45 is a rear perspective view of the disk holder, showing connecting hooks;

Figure 46 is a rear perspective view of the disk holder attached to the panel tile with apertures, showing the backing sheet broken away to illustrate the connecting hooks;

10       Figure 47 is a side view of the disk holder attached to the panel tile with apertures, showing the backing sheet and connecting hooks;

Figure 48 is a side view of the disk holder, showing the disk holder supported on a worksurface;

15       Figure 49 is a side view of a bundle clip attached to the panel tile with apertures;

Figure 50 is an exploded front perspective view of the bundle clip;

Figure 51 is a cross-section view of the bundle clip;

Figure 52 is a rear perspective view of the bundle clip, showing upper connecting hooks and a lower connecting hook;

20       Figure 53 is a rear perspective view of the bundle clip attached to the panel tile with apertures, showing the backing sheet broken away to illustrate the upper and lower connecting hooks;

Figure 54 is a side view of the bundle clip attached to a portion of the tool rail;

25       Figure 55 is front perspective view of a document gripper;

Figure 56 is a rear perspective view of the document gripper, showing upper connecting hooks and a lower connecting hook;

Figure 57 is a bottom perspective view of the document gripper, showing offset ribs;

30       Figure 58 is a front perspective view of a fabric frame tile;

Figure 59 is an exploded rear perspective view of the fabric frame tile;



Figure 60 is a further exploded rear perspective view of the fabric frame tile;

Figure 61 is a cross-section view of the fabric frame tile along section-line 61-61 from Figure 59;

5           Figure 62 is a cross-section view of the fabric frame tile along section-line 62-62 from Figure 59;

Figure 63 is a top perspective view of a wire management cleat;

Figure 64 is an exploded bottom perspective view of the wire management cleat attached to an underside of a worksurface;

10           Figure 65 is an exploded bottom perspective view of the wire management cleat attached to an extended portion of the underside of the worksurface;

Figure 66 is a top plan view of the wire management cleat;

Figure 67 is a front perspective view of a file organizer; and

15           Figure 68 is a rear perspective view of the file organizer.

## DESCRIPTION

Referring now to the drawings, and particularly to Figure 1, workspace panels 8 are provided with a number of convenient accessories attached thereto. The provided accessories make the workspace more useful and functional for workers using the workspace. Additionally, the accessories may be interchangeable with existing workspace panels, thereby inexpensively providing added usefulness and functionality to older workspace panels. One example of a workspace panel that may be used with the accessories is disclosed in U.S. Pat. No. 4,685,255 to Kelly entitled Work Space Management System, which is hereby incorporated by reference.

20 Accordingly, a monorail 10 is provided with a privacy screen 60, a light reflecting screen 62, a linear light 76, a flexible light 94 and storage units 110 attached thereto. A panel tile 150 with apertures 152 is also provided with a display tray 160, a document holder 194, a storage tray 218, a pencil holder 240, a disk holder 258, a bundle clip 282 and a document gripper 308  
30 attached thereto. A fabric frame tile 324 is also provided to diffuse light into

the workspace and to support papers tacked thereagainst. A wire management cleat 348 is also provided for storing excess lengths of wire below a worksurface 6.

Referring now to Figures 2-28, and particularly to Figures 2-4, a monorail 10 is provided for attaching a variety of accessories along a length of a workspace panel 8. In order to minimize the cost of the monorail 10, the monorail 10 may be manufactured as an extruded length of aluminum material. The use of an extrusion process also allows complex features extending along the entire length of the monorail 10 to be incorporated into the monorail 10.

Although the monorail 10 may be attached to the workspace panel 8 in several different orientations, the monorail 10 is preferably attached longitudinally to the top surface 9 of the frame 7 of the workspace panel 8. This attachment location for the monorail 10 allows a number of accessories which are described below to be readily attached to the top surface 9 of the workspace panel 8. Since the attaching features, described below, extend along the entire length of the monorail 10, the accessories may also be attached at any desired longitudinal position and may be easily slid along the length of the monorail 10 as desired.

The monorail 10 is attached to the frame 7 of the workspace panel 8 with screws 12 that extend downward from the monorail 10 and into the top of the workspace panel 8. The head 13 of the screw 12 is retained within the monorail 10 by a lower retention groove 16. Lower retention flanges 18 are also provided which are squeezed between the head 13 of the screw 12 and the top surface 9 of the workspace panel 8, thereby retaining the monorail 10 against the top surface 9 of the workspace panel 8. The width of the opening 20 between the lower retention flanges 18 may be sized to engage anti-rotation surfaces 14 on the screw 12 to make installation of the monorail 10 easier. A spacer 22 may also be provided between the monorail 10 and the top surface 9 of the workspace panel 8 if desired to adapt the monorail 10 to the top surface 9 of the workspace panel 8 and to raise the height of the monorail 10. The spacer 22 may include upwardly facing retention flanges 24

that are inserted into lower side grooves 26 in the monorail 10. The spacer 22 may also include downwardly facing retention flanges 28 that abut against the workspace panel 8. It is apparent, therefore, that the spacer 22 provides additional lateral rigidity of the attachment between the monorail 10 and the workspace panel 8.

An upper retention groove 30 is also provided that is similar to the lower retention groove 16. The upper retention groove 30 includes upper retention flanges 32 and an opening 34 between the retention flanges 32 that is sized to engage anti-rotation surfaces 38 on a screw 36. Therefore, it is now apparent that, like the lower attaching screw 12, an upper accessory attaching screw 36 may be installed in the monorail 10 by inserting the head 37 of the screw 36 into the retention groove 30 at one of the open ends 40 of the monorail 10. The screw 36 can then be slid along the length of the monorail 10 to the desired attaching position. The upwardly facing attaching screw 36 may then be used to attach accessories to the monorail 10 as will be described below.

Side attaching members 42 are also provided on both sides 11 of the monorail 10 for attaching other accessories. The side attaching members 42 include a top channel 44, a bottom channel 46 and an outer flange 48. A rib 50 is formed between the top and bottom channels 44, 46, and the outer flange 48 forms side surfaces 45, 47 of the top and bottom channels 44, 46. A tab 52 is also provided along the outer surface 49 of the flange 48.

Accordingly, it is apparent that accessories may be attached to the side attaching members 42 by either sliding an accessory attaching mechanism onto the top and bottom channels 44, 46 from the open ends 40 of the monorail 10 or by clamping or snapping the accessory attaching mechanism around the top and bottom channels 44, 46. Although the side attaching members 42 may be provided along only one side of the monorail 10, or may be provided in the middle of the monorail 10, two side attaching members 42 at opposing sides are preferred so that accessories may be attached to service both sides of the workspace panel 8.

Cable management grooves 54 are also provided along the top of the monorail 10. The cable management grooves 54 may be sized deep enough and wide enough to accept a number of different wires with both small and large diameters. It is apparent that the cable management grooves 54 may be used to route wires from the accessories which are attached to the monorail 10. Accordingly, the cable management grooves 54 hide the wires from casual observation, but the wires can be readily observed and rearranged from a viewing angle above the workspace panel 8.

To improve the appearance of the monorail 10 and prevent accessories from sliding off the ends of the monorail 10, an end cap 56 may be attached to the ends of the monorail 10. Screws 58 are used to attach the end cap 56 to the ends 40 of the monorail 10 which self-thread into the lower side grooves 26.

The many advantages of the monorail 10 are now apparent. The monorail 10 provides a compact, unobtrusive structure for attaching accessories along a length of the workspace panel 8. The accessories may also be attached at any position along the monorail 10 and may be slid along the length of the monorail 10 as desired. The monorail 10 is also attractive and stylistic. In addition, the monorail 10 is inexpensive to manufacture and easy to attach to the workspace panel 8. Accordingly, the monorail 10 may be attached to older workspace panels already in use to inexpensively provide additional functionality to older workspace panels.

Turning now to Figures 5-12, one accessory that may be attached to the monorail 10 is a privacy screen 60 or a light reflecting screen 62.

Typically, the screen 60, 62 includes a fabric material 61 that extends between the legs 74 and the upper and lower cross members 63, 65. The screens 60, 62 may be attached to the monorail 10 using a screw 36 as described above that extends upwardly from the upper retention groove 30. Accordingly, the outwardly facing threaded portion 39 of the screw 36 is threaded into the bottom wall 66 of a retaining member 64. The retaining member 64 includes an inner cylindrical diameter 68 formed by the side walls 70 and an opening 72 for receiving a leg 74 of the screen 60, 62. A set screw

75 may be used to retain the leg 74 within the retaining member 64. Therefore, it is apparent that the screens 60, 62 extend upward from the top surface 9 of the workspace panel 8. Accordingly, the privacy screen 60 makes it possible to use shorter and less expensive workspace panels 8 while providing a similar level of privacy as taller workspace panels. Furthermore, the light reflecting screen 62, or curved screen 62, may be used in combination with lights to reflect light into the workspace.

The privacy screen 60 and the light reflecting screen 62 may alternatively be attached to the monorail 10 with an attaching mechanism 378 using the side attaching members 42. The attaching mechanism 378 includes a first member 380 and a second member 382 that are connected together with a shoulder screw 384. The first member 380 includes a rib 386 that is installed into the top channel 44 of the monorail 10 and a bottom surface 388 that engages the top of the outer flange 48. The second member 382 includes a first side surface 390 that engages the outer surface 49 of the flange 48. The second member 382 also includes a flange 396 extending out from the first side surface 390 thereby forming a top surface 398 and a second side surface 400. The top surface 398 engages the bottom of the outer flange 48, while the second side surface 400 engages the side 11 of the monorail 10.

The first side surface 390 and the second side surface 400 of the second member 382 both include a contoured portion 394, 404 to make attachment of the attaching mechanism 378 easier and faster. Thus, the first side surface 390 includes both a first flat portion 392 and a first contoured portion 394. Similarly, the second side surface 400 includes a second flat portion 402 and a second contoured portion 404. Accordingly, the shoulder screw 384 allows the second member 382 to rotate relative to the first member 380. It is apparent therefore that the attaching mechanism 378 is attached to the monorail 10 by rotating the second member 382 until the flange 396 is oriented away from the rib 386 of the first member 380. The first member 380 is then installed onto one of the side attaching members 42 of the monorail 10 by inserting the rib 386 into the top channel 44. The second

member 382 is then rotated towards the monorail 10 with the contoured portions 394, 404 passing by the monorail 10 before the flat portions 392, 402 until the flat portions 392, 402 engage securely against the outer surface 49 of the flange 48 and the side 11 of the monorail 10. Thus, the contoured portions 394, 404 allow the second member 382 to rotate into place without the need for disassembling the second member 382 from the first member 380.

One of the legs 74 of the screen 60, 62 is then inserted into the inner diameter 406 through the top opening 408. The leg 74 may be secured to the attaching mechanism 378 with a set screw 407. The leg 74 of the screen 60, 62 may also be formed from a spring 410 instead of a rigid tubular material. A spring leg 410 is preferred when it is expected that the screen 60, 62 will experience repeated forces that could fracture a rigid leg. A side connecting member 412 is also provided for connecting the lower cross member 65 of the screen 60, 62 to the attaching mechanism 378.

Turning now to Figures 13-15, another accessory that may be attached to the monorail 10 is a linear light 76. The linear light 76 may be attached to the monorail 10 using the side attaching members 42. Accordingly, the linear light 76 includes a lighting element 78 that extends parallel to the monorail 10. The lighting element 78 is attached to the monorail 10 with legs 80 that are attached to each end of the lighting element 78 and that extend to attaching mechanisms 82. Each of the attaching mechanisms 82 include a first clamping member 84 with a surface 86 that engages the outer surface 49 of the outer flange 48. The first clamping member 84 also includes a slot 88 that engages the tab 52 attached to the outer flange 48. The attaching mechanism 82 also includes a second clamping member 90 that is secured to the first clamping member 84 with screws 92 threaded into the first clamping member 84. The second clamping member 90 engages the inside side surface 45 of one of the channels 44. Preferably, the linear light 76 may be used in combination with the curved screen 62 to reflect light into the workspace. Thus, the linear light 76 may be attached to the monorail 10

adjacent and coaxial with the curved screen 62 along the longitudinal curvature of the screen 62.

Turning now to Figures 16-17, another accessory that may be attached to the monorail 10 is a flexible light 94. The flexible light 94 may be attached to the monorail 10 using the upper retention groove 30. The flexible light 94 includes a lighting element 96 connected to one end of a flexible portion 100. An attaching mechanism 102 is connected to the other end of the flexible portion 100. The attaching mechanism 102 is then attached to the monorail 10. Accordingly, the lighting element 96 can be easily repositioned by bending the flexible portion 100 to direct light towards different areas in the workspace as desired.

Preferably, the attaching mechanism 102 includes a top portion 104 and a bottom portion 108 that are made from a molded material to facilitate assembly of the attaching mechanism 102. A threaded adaptor 107 is also provided within the attaching mechanism 102 for threadably connecting the flexible portion 100 to the attaching mechanism 102. A hole 106 is provided that extends through both the top portion 104 and the bottom portion 108. Accordingly, the attaching mechanism 102 is attached to the monorail 10 with a screw 99 that passes through the hole 106 and into the upper retention groove 30. The screw 99 is then threaded into a retaining nut 101 that is installed in the upper retention groove 30. Thus, the bottom surface 103 of the attaching mechanism 102 is secured against the upper retention flanges 32 and the top of the monorail 10.

A hook 105 is also provided for further securing the attaching mechanism 102 to the monorail 10. Accordingly, the hook 105 may engage the tab 52 on the outer flange 48 of one of the side attaching members 42. The hook 105 therefore locks the attaching mechanism 102 and prevents rotation around the screw 99. The hook 105 also positively locates the switch 98 outward toward the side to allow easy access from within the workspace. One advantage of the attaching mechanism 102 is that it allows the flexible light 94 to be used in conjunction with the privacy screen 60 or the light reflecting screen 62. Accordingly, the flexible portion 100 is connected to the

attaching mechanism 102 away from the upper retention groove 30. Thus, the screen 60 may extend above the upper retention groove 30 without interfering with the flexible light 94. Alternatively, the attaching mechanism 102 may be rotated ninety degrees and mounted to the monorail 10 by inserting the hook 105 into the opening 34 in the upper retention groove 30 between the upper retention flanges 32. In this orientation, the hook 105 also locks the attaching mechanism 102 from rotational movement because the side surfaces 109 of the hook 105 abut the upper retention flanges 32.

Turning now to Figures 18-28, another accessory that may be attached to the monorail 10 is a horizontal or vertical storage unit 110. The storage units 110 may be attached to the monorail 10 using the side attaching members 42. Accordingly, an attaching mechanism 112 is provided along the rear side 114 of the storage unit 110. The attaching mechanism 112 includes an inverted U-shaped hook 116 at each side of the storage unit 110. Thus, the first vertical rib 118 of the hook 116 is inserted into the top channel 44 of the side attaching member 42 and the second vertical rib 120 of the hook 116 is attached to the rear side 114 of the storage unit 110. Therefore, the storage unit 110 hangs from the U-shaped hook 116 and the monorail 10.

Preferably, the storage unit 110 may be attached to the monorail 10 at different heights relative to the top of the workspace panel 8 or relative to a worksurface 6. Accordingly, a bracket assembly 122 attached to the rear side 114 of the storage unit 110 is provided. The bracket assembly 122 includes a pair of first bracket members 124, with each first bracket member 124 extending along a portion of the height of the storage unit 110 along each side of the storage unit 110. The first bracket members 124 include two connecting arms 126 extending forward toward the storage unit 110. Each of the connecting arms 126 include three angled finger members 128 extending outward toward the sides of the storage unit 110. The connecting arms 126 extend through corresponding slots 130 in the second bracket members 132. Each of the second bracket members 132 include a side retaining member 134 that extends along a portion of the height of the storage unit 110 along each side of the storage unit 110. Each of the second bracket members 132



is welded along the top end to the attaching mechanism bracket 136. Corresponding holes 138, 140 are also provided through the first bracket member 124 and the second bracket member 132 to secure the first and second bracket members 124, 132 together.

5           Therefore, the bracket assembly 122 may be attached to the storage unit 110 at multiple vertical positions. Accordingly, the bracket assembly 122 is attached to the rear side 114 of the storage unit 110 by inserting the angled finger members 128 of the first bracket member 124 into cavities 142 in the side panels 144 of the storage unit 110. At the same time, the side retaining members 134 of the second bracket members 132 engage an outside surface 146 of the side panels 144. The holes 138, 140 in the first and second bracket members 124, 132 are then aligned and retained together with screws 148. Thus, the angled finger members 128 are now secured to the cavities 142 in the side panels 144 and cannot be disengaged. In order to disengage the angled finger members 128 from the cavities 142, the screws 148 are removed from the corresponding holes 138, 140 in the first and second bracket members 124, 132. The first bracket member 124 may then be shifted inward so that the connecting arms 126 translate across the slots 130 in the second bracket members 132 and the angled finger members 128 disengage from the cavities 142. The bracket assembly 122 can then be relocated along the height of the storage unit 110 to reengage the angled finger members 128 in a different set of cavities 142.

          Accordingly, the storage unit 110 can be easily attached to the monorail 10 at more than one vertical position. One advantage of this feature is that shorter, less expensive workspace panels 8 may be used while providing a similar vertical position of the storage unit 110 relative to the worksurface 6 as is typical with taller workspace panels. Thus, at least three different vertical positions are possible. The storage unit 110 may be attached to the monorail at a first position that is about 16 inches below the top surface 111 of the storage unit 110. The storage unit 110 may also be attached to the monorail 10 at a second position that is about 8 inches below the top surface 111 of the storage unit 110. The storage unit 110 may also be

attached to the monorail 10 at a third position that is about flush with the top surface 111 of the storage unit 110.

Referring now to Figures 29-57, a panel tile 150 is provided with apertures 152 through a surface 154 for connecting a variety of work tools to the workspace panel 8. Each of the apertures 152 is shaped oblong and may be about 0.55 inch high and 0.75 inch wide. The apertures 152 are positioned along rows, with the apertures 152 being spaced about 1.0 inch apart along the rows and each row being spaced about 0.8 inch apart. The panel surface 154 may be made from a sheet metal material.

Preferably, the panel tile 150 with apertures 152 is a removable tile that can be readily attached to and detached from a panel frame 7. Accordingly, attaching mechanisms 156, 157, which may be snaps 156 or hooks 157, are provided along the rear side of the panel tile 150 at each corner of the panel tile 150. Additionally, a backing sheet 158 is provided along the rear side of the panel tile 150. The backing sheet 158 may be made from a high density polyethylene material that is about 0.20 inch thick. The backing sheet 158 may be attached at each edge of the panel tile 150 so that it extends across the entire back surface of the panel tile 150.

The many advantages of the panel tile 150 with apertures 152 are now apparent. The apertures 152 may be used to attach a variety of work tools to a surface 154 of the workspace panel 8. Some of the possible work tools that may be attached to the apertures 152 are described below. Since the panel tile 150 is a removable tile, the location of the panel tile 150 can be optimized by the user of the workspace so that the work tools attached thereto are conveniently positioned. In addition, the panel tile 150 may be compatible with older workspace panels already in use, thus inexpensively providing additional functionality to older workspace panels. The apertures 152 also allow light to diffuse through the apertures 152 from outside the workspace to provide more lighting inside the workspace. The backing sheet 158 also improves the diffusion of light into the workspace by allowing light to pass through the apertures 152 while blocking visual sight through the apertures

152. The backing sheet 158 also prevents viewing of the interior of the panel frame structure and unsightly cables and wires therein.

Turning now to Figures 29-33, one work tool that may be attached to the panel tile 150 with apertures 152 is a display tray 160. The display tray 160 includes a single large receptacle 162 that extends across the entire length and width of the display tray 160. Side walls 164, a front wall 166, a back wall 168 and a bottom wall 170 are also provided for retaining items within the display tray 160. Typically, larger office supplies like staplers, tape dispensers or standing picture frames are stored in the receptacle 162.

The display tray 160 includes connecting hooks 172, or attaching members 172, along a rear support wall 161 for attaching the display tray 160 to the panel tile 150 with apertures 152. In order to adequately support the weight of the display tray 160 and the items stored therein, a multitude of connecting hooks 172 may be provided, with each hook 172 spaced about 1 inch apart from each other. To reduce the cost of manufacture, the connecting hooks 172 may be plastic and integrally molded with the rear support wall 161 or the entire display tray 160.

The connecting hooks 172 may also include two attachment portions 174, 176 for attaching the display tray 160 to different work tool support structures. The first attachment portion 174 includes a top support surface 178 and a side retaining surface 180. Similarly, the second attachment portion 176 includes a top support surface 182 that is lower than the first attachment portion top support surface 178 and a side retaining portion 184 that is disposed farther from the rear support wall 161 than the first attachment portion side retaining surface 180.

Accordingly, the first attachment portion 174 can be used to attach the display tray 160 to the panel tile 150 with apertures 152. This alternative is accomplished by inserting the hooks 172 into the apertures 152 so that the display tray rear support wall 161 abuts the outer surface 154 of the panel tile 150 and the first attachment portion top support surface 178 abuts the lower edge 151 of the apertures 152. The first attachment portion side retaining surface 180 then prevents the display tray 160 from being inadvertently

dislodged from the panel tile 150 with apertures 152. Similarly, the second attachment portion 176 may be used to attach the display tray 160 to a tool rail 186, or other alternative work tool support structure, having horizontal rails 188 that are vertically spaced apart from each other. This alternative is accomplished by inserting the hooks 172 between and through the rails 188 so that the display tray rear support wall 161 abuts the outer surfaces 190 of adjacent rails 188 and the second attachment portion top support surface 182 abuts the top edge 192 of one of the rails 186. The second attachment portion side retaining surface 184 then prevents the display tray 160 from being inadvertently dislodged from the tool rail 186.

Turning now to Figures 34-38, another work tool that may be attached to the panel tile 150 with apertures 152 is a document holder 194. The document holder 194 includes a front wall 196 and a rear wall 198 that are separated by a storage space 200 therebetween. The front and rear walls 196, 198 are connected together by a bottom support wall 202 and a single side support wall 204. Along the rear support wall 195 is a multitude of connecting hooks 206 similar to the display tray connecting hooks 172 described above. Thus, the document holder 194 may be attached alternatively to the panel tile 150 with apertures 152 or to a tool rail 186. Preferably, the document holder 194 is molded from a plastic material, with one piece including the front wall 196, the side support wall 204 and the bottom support wall 202 and another piece including the rear wall 198 and the connecting hooks 172.

The bottom support wall 202 may be angled downward toward the side support wall 204, with the side support wall 204 being oriented at a right angle therefrom. Thus, when documents are placed in the document holder 194, gravity will draw the documents into the storage space 200 and against the side support wall 204. Open areas 208, 210 are provided along the side opposite of the side support wall 204 and along the top to make it easier to place documents in the document holder 194. The bottom support wall 202 extends only partially along the length of the document holder 194, and the side support wall 204 extends only partially along the height of the document

holder 194. Accordingly, the bottom and side support walls 202, 204 do not intersect, and an open area 212 is formed at the corner of the bottom and side support walls 202, 204. Additionally, the front wall 196 and the rear wall 198 are shaped with rounded, obtuse contours 214, 216 adjacent the open corner area 212 and opposite the open corner area 212. Therefore, when documents are placed in the storage space 200, the lower inside corner of the documents is easily visible from below the document holder 194. The open corner area 212 also provides the document holder 194 with a self-cleaning feature that prevents debris from accumulating in the storage space 200. The upper outside corner of the documents is also easily visible and also provides a large convenient portion of the documents that can be grasped for removing the documents or placing the documents in the storage space 200. The front wall 196 may also be flaired forward along the upper outside contour 216 to make placing documents in the storage space 200 easier.

Turning now to Figures 39-40, another work tool that may be attached to the panel tile with apertures is a storage tray 218. The storage tray 218 includes a multitude of connecting hooks 220 along the rear support wall 219 similar to the display tray connecting hooks 172 described above. Thus, the storage tray 218 may be attached alternatively to the panel tile 150 with apertures 152 or to a tool rail 186. The storage tray 218 includes a variety of storage receptacles for conveniently storing different types of office supplies together. Preferably, the storage tray 218 is integrally molded from a plastic material.

The storage tray 218 includes one lengthwise receptacle 222 adjacent the rear support wall 219. Adjacent each end of the lengthwise receptacle 222 is an aperture 224 that may be used for storing scissors, flower vials or like items. A multi-compartment lengthwise receptacle 226 is also provided adjacent the lengthwise receptacle 222. The multi-compartment receptacle 226 includes a lengthwise dividing wall 228 between two compartments 230, 232. A ledge 234 is also provided on the rear wall 236 of the rear compartment 230 that can be used to display business cards. At each end of the multi-compartment lengthwise receptacle 226 is a smaller receptacle 238

that is about the same width as the multi-compartment receptacle 226 but shorter in length.

Turning now to Figures 41-43, another work tool that may be attached to the panel tile 150 with apertures 152 is a pencil holder 240. The pencil holder 240 includes a multitude of connecting hooks 242 along the rear support wall 241 similar to the display tray connecting hooks 172 described above. Thus, the pencil holder 240 may be attached alternatively to the panel tile 150 with apertures 152 or to a tool rail 186. The pencil holder 240 includes a large vertical receptacle 244 for storing office supplies like pencils, pens, scissors and like items. Preferably, the pencil holder 240 is integrally molded from a plastic material.

The pencil holder 240 includes two dividing walls 246 that extend up from the bottom wall 248 to near the top edge of the side walls 250. The dividing walls 246 may be swept outward. A top opening 252 is provided at the top edge of the side walls 250 and the rear wall 254. Thus, three vertical compartments 256 are formed in the receptacle 244. Various items can be stored in the pencil holder 240 by lowering the items through the top opening 252 into the receptacle 244 and into one of the three compartments 256.

Turning now to Figures 44-48, another work tool that may be attached to the panel tile 150 with apertures 152 is a disk holder 258. The disk holder 258 includes a multitude of connecting hooks 260 along the rear support wall 259 similar to the display tray connecting hooks 172 described above. Thus, the disk holder 258 may be attached alternatively to the panel tile 150 with apertures 152 or to a tool rail 186. The disk holder 258 includes a receptacle 262 for storing disk-like storage media. Preferably, the disk holder 258 is integrally molded from a plastic material.

The disk holder 258 includes a bottom support wall 264 that is angle upward from an imaginary horizontal plane. Ridges 265 may be provided on the bottom support wall 264 to partially separate the disks. A back support wall 266 is attached to the bottom support wall 264 at a right angle thereto. Thus, when the disk holder 258 is attached to the panel tile 150 with apertures 152 or to a tool rail 186, the tilted angle of the receptacle 262 draws disks

placed therein into the receptacle 262 and toward the back support wall 266. The front 268 and top 270 of the disk holder are open to provide easy access into the receptacle 262. Side ribs 272 are also attached along the sides, with one end being attached to the back support wall 266 and the other end being attached to the bottom support wall 264. Thus, the side ribs 272 support the bottom support wall 264 and also provide an open side area 274 to allow viewing of the receptacle 262 from the side.

The rear support wall 259 also forms rearward legs 276 at the bottom thereof. In addition, forward legs 278 that are attached to the bottom support wall 264 are also provided. The bottom ends of the rearward legs 276 and the forward legs 278 lie on a horizontal plane transverse the rear support wall 261. Accordingly, the disk holder 258 may also be used on a horizontal worksurface 6 when not attached to the panel tile 150 with apertures 152 or to the tool rail 186. Therefore, by resting the disk holder 258 on a worksurface 6, the rearward and forward legs 276, 278 support the disk holder 258 while maintaining the tilted angle of the receptacle 262. In addition, the corner 280 of the bottom support wall 264 and the back support wall 266 is positioned near the worksurface 6 to provide additional support if excessive force is applied to the disk holder 258 thereby causing the legs 276, 278 to flex.

Turning now to Figures 49-54, another work tool that may be attached to the panel tile 150 with apertures 152 is a bundle clip 282. The bundle clip 282 is generally intended for clamping a top portion of papers, paper pads, posters and like items. Thus, the papers hang down from the bundle clip 282 for display. The bundle clip 282 includes a rear member 284, an intermediate member 286 and a front member 288 that are retained together with a spring clip 290. The spring clip 290 allows the front member 288 to be flexed away from the rear member 284 and intermediate member 286 in order to insert papers therebetween for clamping.

Connecting hooks 292, 294 are also provided along the rear support wall 283 of the rear member 284. Like the display tray connecting hooks 172, the bundle clip connecting hooks 292, 294 may be used to attach the bundle clip 282 alternatively to the panel tile 150 with apertures 152 or to a tool rail

186 with horizontal rails 188. However, in order to resist higher dislodging forces expected on the bundle clip 282, both upper connecting hooks 292 and a lower connecting hook 294 are provided.

5 The upper connecting hooks 292 include a top surface 296 and a top side retaining surface 298, while the lower connecting hook 294 includes a bottom surface 300. Accordingly, the bundle clip 282 can be attached to the panel tile 150 with apertures 152 by inserting the upper connecting hooks 292 into the apertures 152 so that the top surface 296 abuts the upper edge 153 of the apertures 152 and by inserting the lower connecting hook 294 into an aperture 152 so that the bottom surface 300 abuts the lower edge 151 of the aperture 152. The upper and lower connecting hooks 292, 294 may flex during insertion to maintain a bias force against the apertures 152 after attachment. The upper connecting hook top side retaining surface 298 then prevents the bundle clip 282 from being inadvertently dislodged from the panel tile 150 with apertures 152.

15 The upper connecting hooks 292 also include a bottom surface 302 and a bottom side retaining surface 304, while the lower connecting hook 294 includes a top flexible surface 306. Accordingly, the bundle clip 282 can be attached to the tool rail 186 by positioning the upper connecting hook 292 so that the bottom surface 302 abuts the top edge 192 of a rail 188 and by flexing the lower connecting hook 294 so that the top flexible surface 306 contacts the bottom edge 193 of a rail 188. The flexing of the upper and lower connecting hooks 292, 294 maintains a bias force against the rails 188 after attachment. The bottom side retaining surface 304 then prevents the bundle clip 282 from being inadvertently dislodged from the tool rail 186.

20 Turning now to Figures 55-57, another work tool that may be attached to the panel tile 150 with apertures 152 is a document gripper 308. The document gripper 308 is generally intended for retaining a small number of documents along a top portion of the documents. Thus, the documents hang down from the document gripper 308 for display. The document gripper 308 includes an upper connecting hook 310 and a lower connecting hook 312 along the rear support wall 309 similar to the bundle clip connecting hooks



292, 294 described above. Therefore, the document gripper 308 may be attached alternatively to the panel tile 150 with apertures 152 or to a tool rail 186. Like the bundle clip connecting hooks 292, 294, the upper and lower connecting hooks 310, 312 resist higher dislodging forces.

5           The document gripper 308 includes an opening 314 along the bottom side between the front member 316 and the rear member 318. Additionally, offset ribs 320 with serrations 322 are provided on the inside surfaces of the front and rear members 316, 318. Accordingly, when the edge of a document is inserted into the opening 314 through the offset ribs 320, the offset ribs 320  
10       force the edge of the document to fold into grooves around the ribs 320. The folded document grooves then engage the offset ribs 320, thereby producing a friction force that resists removal of the document.

          Turning now to Figures 67-68, another work tool that may be attached to the panel tile 150 with apertures 152 is a file organizer 380. The file  
15       organizer 380 is generally intended for retaining hanging folders, such as those sold under the brand name Pendaflex. Thus, the hanging folders hang adjacent the panel surface 154 of the panel tile 150 for convenient access. The file organizer 380 includes connecting hooks 384 along the rear support wall 382 for attaching the file organizer 380 to the panel tile 150 with  
20       apertures 152 or to a tool rail 186. Extended support surfaces 383 that extend below the rear support wall 382 are also included to provide additional support against the panel tile 150 or tool rail 186.

          Opposing arms 386 extend outward from the rear support wall 382 about 3.5 inches. Each arm 386 includes an upper ledge 390 adjacent the  
25       rear support wall 382 and a lower ledge 388 attached to the upper ledge 390. The upper ledge 390 includes an upper retention knob 391 away from the rear support wall 382, and the lower ledge 388 includes a lower retention knob 389 away from the upper ledge 390. According, hanging folders may be supported by the file organizer 380 by engaging hanging folders onto either  
30       the upper ledge 390 or the lower ledge 388. The upper and lower retention knobs 391, 389 prevent the hanging folders from sliding off of the ledges 390, 388. The difference in height between the upper and lower ledges 390, 388

also allows easier viewing and access to the rear hanging folders supported by the upper ledge 390.

Referring now to Figures 58-62, a fabric frame tile 324 is provided for diffusing light into a workspace and for providing a tackable surface. The fabric frame tile 324 includes vertical stiles 326 that are attached at the corners to horizontal cross members 328. The vertical stiles 326 and horizontal cross members 328 may be made from a variety of materials including a plastic material. The vertical stiles 326 and horizontal cross members 328 are attached together with protrusions 330 extending from the vertical stiles 326 that slide into longitudinal cavities 332 in the horizontal cross members 328. Hooks 334 and clips 336, or other attaching mechanisms, are also provided along the rear side of the vertical stiles 326 for attaching the fabric frame tile 324 to the frame 7 of workspace panel 8.

The fabric frame tile 324 also includes a screen 338 that extends between each of the vertical stiles 326 and each of the horizontal cross members 328. Inward facing longitudinal slots 340 are provided on the vertical stiles 326 and the horizontal cross members 328 for retaining the screen 338. Accordingly, the edges of the screen 338 fit within the longitudinal slots 340, thereby securing the screen 338 in place. Preferably, the screen 338 is made from a semi-transparent material, such as a polycarbonate material. The screen 338 is an extruded sheet with two opposing outer walls 342 connected together with interconnecting walls 344. The screen 338 may be about 0.25 inch thick, with the walls 342, 344 being about 0.025 inch thick. A loose weave fabric 346 is also provided as an outer aesthetic covering for the fabric frame tile 324. The fabric 346 extends across the front side of the fabric frame tile 324 and is wrapped around and retained to the vertical stiles 326 and the horizontal cross members 328.

The many advantages of the fabric frame tile 324 are now apparent. The fabric frame tile 324 allows light to pass from outside a workspace through the semi-transparent screen 338 and loose weave fabric 346 into the workspace. However, visual sight through the fabric frame tile 324 is blocked in order to maintain privacy and to prevent viewing of the internal panel

structure and unsightly wires and cables therein. The fabric 346 covering also maintains an attractive outer appearance and can be matched to other standard tiles used on the workspace panel 8. Furthermore, the screen 338 can support tacks by pressing the tacks through the screen 338, thereby retaining papers and other items against the fabric frame tile 324. In addition, the fabric frame tile 324 may be compatible with older workspace panels already in use, thus inexpensively providing additional functionality to older workspace panels.

Referring now to Figures 63-66, a cleat 348 is provided for managing excess lengths of wire around a worksurface 6. The cleat 348 includes a base section 350 with a mounting face 352 on one side and a flange section 354 on the other side. The flange section 354 extends outward from the side surfaces 351 of the base section 350. A number of first hooks 356 are attached to one of the side edges 355 of the flange section 354. The first hooks 356 are arranged into two pairs, with each pair having two first hooks 356 facing outwardly of each other. The first hooks 356 may have a retaining tab 357 and may be flexible to better retain wires snapped therein. Two secondary cleats 358 are attached to the other side edge 355 of the flange section 354. Each of the secondary cleats 358 include two opposing surfaces 360 transverse to the flange section side edge 355. The secondary cleats 358 also include side surfaces 362 extending from the opposing surfaces 360 which are parallel to the flange section side edge 355. At the outer edge 364 of each of the secondary cleats 358 are two second hooks 366 with retaining tabs 368 similar to the first hooks 356 described above. Two holes 370 extend through the base section 350 to allow screws 372 to pass therethrough for attaching the cleat 348 to mounting surfaces 374.

The many advantages of the cleat 348 are now apparent. The cleat 348 may be attached to a variety of mounting surfaces but is especially useful when attached to the underside 374 of a worksurface 6. The cleat 348 may be attached directly to the worksurface 6 or to an extended portion 376 from the worksurface 6 with screws 372 passing through the holes 370 in the base section 350. Excess lengths of wire can then be wrapped around the side

surfaces 351 of the base section 350 with the ends being snapped into the first hooks 356. Accordingly, the first hooks 356 and the flange section 354 retain the excess wire and prevent the wire from unwrapping from the cleat 348. Smaller lengths of excess wire may also be wrapped around the  
5 opposing surfaces 360 of the secondary cleats 358, with the ends being snapped into the second hooks 366. Thus, the cleat 348 is able to store more than one excess length of wire.

The above-described accessories and features may also be used with the accessories and features described in U.S. Pat. Appl. No. 60/298,361 to  
10 Smith et al. (Atty. Docket No. 3591-1108) filed on June 16, 2001, entitled Furniture System, which is hereby incorporated by reference.

While a preferred embodiment of the invention has been described, it should be understood that the invention is not so limited, and modifications may be made without departing from the invention. The scope of the  
15 invention is defined by the appended claims, and all devices that come within the meaning of the claims, either literally or by equivalence, are intended to be embraced therein.